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## Systematic Review and Meta-Analyses

# Interventions to improve immigrant health. A scoping review

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**Background:** Disparities in health between immigrants and their host populations have been described across countries and continents. Hence, interventions for improving health targeting general populations are not necessarily effective for immigrants. **Aims:** To conduct a systematic search of the literature evaluating health interventions for immigrants; to map the characteristics of identified studies including range of interventions, immigrant populations and their host countries, clinical areas targeted and reported evaluations, challenges and limitations of the interventions identified. Following the results, to develop recommendations for research in the field. **Methods:** A scoping review approach was chosen to provide an overview of the type, extent and quantity of research available. Studies were included if they empirically evaluated health interventions targeting immigrants and/or their descendants, included a control group, and were published in English (PubMed and Embase from 1990 to 2015). **Results:** Most of the 83 studies included were conducted in the USA, encompassed few immigrant groups and used a randomized controlled trial (RCT) or cluster RCT design. Most interventions addressed chronic and non-communicable diseases and attendance at cancer screening services, used individual targeted approaches, targeted adult women and recruited participants from health centres. Outcome measures were often subjective, with the exception of interventions for cardiovascular risk and diabetes. Generally, authors claimed that interventions were beneficial, despite a number of reported limitations. **Conclusions:** Recommendations for enhancing interventions to improve immigrant health are provided to help researchers, funders and health care commissioners when deciding upon the scope, nature and design of future research in this area.

## Introduction

International migrants are defined as persons who are moving or have moved across an international border away from their habitual place of residence, regardless of the causes for the movement or the voluntariness of their decision.<sup>1</sup> The number of international migrants has grown at an unprecedented rate during the last 15 years, reaching 244 million in 2015, 3.3% of the global population compared with 2.8% in 2000. In Europe, North America and Oceania, international migrants account for at least 10% of the total population. However, in relative terms, the countries in the Middle East have the largest proportion of immigrants.<sup>2</sup>

In most settings, immigrants represent a highly heterogeneous sub-group of the population in terms of their reasons for migration, skills, education, occupation, culture and social status. Some of them are structurally vulnerable, especially refugees, asylum seekers and undocumented migrants, who are differentially exposed to a range of potentially health-damaging circumstances.

Others demonstrate the ‘healthy migrant effect’, whereby they appear to have better health status than the host population and show high levels of resilience. Despite their diversity, a number of health-related differences in need,<sup>3,4</sup> entitlements,<sup>5,6</sup> use of services,<sup>7,8</sup> treatments given<sup>9,10</sup> and even mortality<sup>11,12</sup> between immigrants and their host populations have been described. These differences may be positive or negative and also depend upon the host context and the geographic origin, reason for migration,<sup>13</sup> migrant status defined by legal grounds for obtaining a residence<sup>4</sup> and life course<sup>14</sup> of the immigrant.

When the health needs of immigrants differ to those of the host population, interventions targeting the general population may or may not prioritize the needs of migrants. In addition, the effectiveness of any intervention may also differ for biological or sociocultural reasons. For example, a drug may be less effective either because its pharmacological action differs or compliance is different due to varying cultural beliefs and attitudes to side effects. Some countries have developed guidelines for the health assessment, diagnosis and

treatment for immigrants and/or refugees.<sup>15,16</sup> However, these guidelines are often based on existing evidence from the wider general population that typically exclude migrants and usually target specific situations, like recent arrival at the host country.<sup>15,17</sup>

In the actual scenario of rapidly increasing migration to Europe, there is an urgent need to know which mainstream and/or alternative interventions have been evaluated among immigrants to be able to understand and prioritize health interventions in both host and immigrant populations. To the best of our knowledge, there is no overview of studies evaluating health interventions aimed at improving health outcomes among immigrants. The objectives of this study were therefore to (i) conduct a systematic search of the published literature evaluating health interventions for immigrants; (ii) map the characteristics of the identified studies; (iii) map the range of interventions identified, including host and immigrant populations, clinical areas targeted and types of intervention, and (iv) examine the reported evaluations, challenges and limitations of the interventions identified.

## Methods

In 2014, an interdisciplinary research group entitled Health Outcomes of Migration Events (HOME) was established, to address the conceptual, methodological and policy challenges related to migration and health, under the umbrella of the Worldwide Universities Network (WUN). The group included expertise in public health, epidemiology, health geography, anthropology, nursery, nutrition, medicine and health economy. Early in our collaboration, we identified the need to map and synthesize any interventions that had been conducted and evaluated in order to improve health and health care access among migrants and their descendants. Based on the methodology proposed by Arksey and O'Malley,<sup>18</sup> we conducted a scoping review, while remaining flexible to clarifying concepts and revising the research question as the team became familiar with the literature as recommended by Daudt *et al.*<sup>19</sup> The five methodological stages are presented in detail in Supplementary table S1.

The criteria for including articles in the scoping review were: (i) published studies presenting results of health interventions, (ii) including immigrants, and/or their descendants (iii) subjected to a comparative evaluation (defined as including a control group or using a before/after design) and (iv) written in English. PubMed and Embase were selected, in addition to Cochrane reviews, as these databases were the most relevant in the health field at the international level. The Medical Subject Headings terms (Emigration and Immigration, Emigrants and Immigrants, Refugees, Delivery of Health care, Health Status) and keywords (immigrant\*, refugee\*, emigrant\* and health) were used jointly. Thematic filters applied were: (i) Immigration: Emigrants and Immigrants, Emigration and Immigration, Refugees; and (ii) Health: Delivery of health, Health.

Using an iterative approach to the selection of studies, potentially relevant articles were first identified by title by ED and GOB. When the title proved to be inconclusive for assessing potential relevance, abstracts were read to decide whether a specific study should be included. Detected studies describing relevant interventions but not reporting results were not included, but were followed to try to find later articles presenting results, that were included. Differences of opinion regarding eligibility were resolved through consensus adjudication. Subsequent full-article data extraction finalized the application of the inclusion criteria where the first reading appeared relevant but the article's content was not.

The first version of the checklist of variables to be extracted from each article was developed by ED and GOB based on the first evaluation of the abstracts made by the two first authors, and further discussed with the rest of the group. When compiling the final checklist (Supplementary table S2), we attempted to balance feasibility with breadth and comprehensiveness of the scoping process. Given the wide disciplinary background of the researchers involved in variable extraction, some of the variables in the checklist

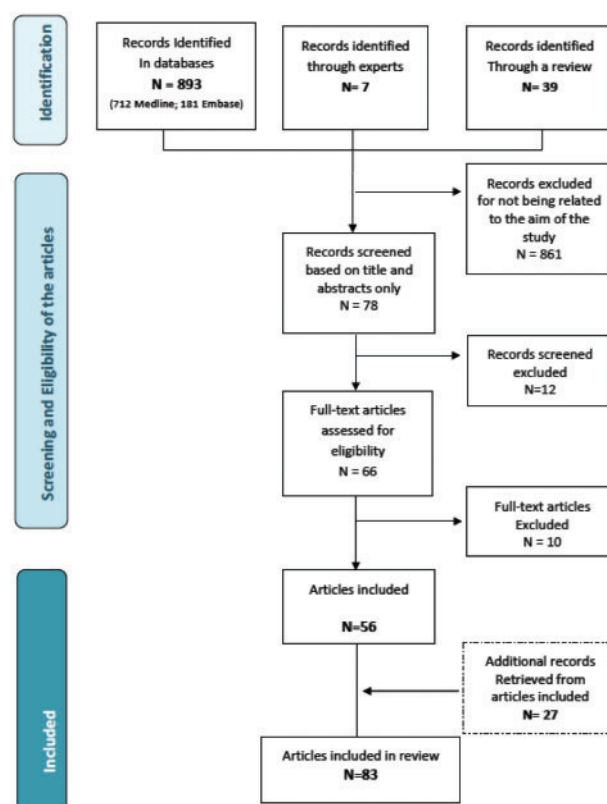


Figure 1 Flow diagram of study selection

were categorized, and types of interventions were pre-defined according to the classification generated by Han *et al.*<sup>20</sup> Definitions for each of these pre-categorized variables were provided together with the checklist to enhance consistency of variable extraction and categorization by different researchers. Some articles were read by more than two authors, and any disagreement was resolved by ED.

Information on the variables extracted from the selected studies was collated and summarized to inform subsequent recommendations for policy, practice and research. All recommendations were agreed by consensus.

## Results

### Search and selection of articles

The original search conducted in June 2015 yielded 893 potentially relevant citations. A flow diagram showing the selection process is illustrated in figure 1. A total of 83 studies met the eligibility criteria and were assessed in detail using the final checklist.

### Characteristics of the studies

The general characteristics of the studies are summarized in table 1 and details for each study presented in Supplementary table S3. Approximately five studies were published over each 2-year period up until 2008, whereupon this number doubled. Most studies were designed as randomized controlled trials (RCTs) and cluster RCTs, and one-quarter of the studies were described as quasi-experimental or other. The studies typically included 100–500 individuals at baseline. Only six studies had more than 1000 participants, three of which were designed as cluster RCTs or as quasi-experimental studies. Routine care or another active intervention was most often used as the comparative reference, in 41 and 26 of the studies, respectively. The findings of two different interventions in one head-to-head trial were presented in two articles without a separate control. Ten studies had a waiting list control design.

**Table 1** General characteristics of the included studies (*n* = 83)

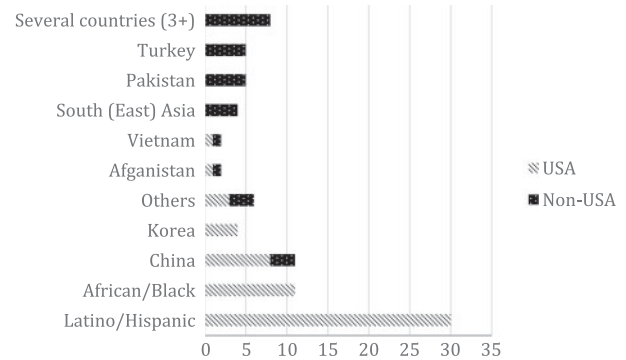
	Number (%) of studies
Publication year	
Up to 2000	5 (6)
2001–4	11 (13)
2005–8	12 (14)
2009–12	42 (51)
2013–14	13 (16)
Design	
RCT	50 (60)
Cluster RCT	13 (16)
Quasi-experimental	15 (18)
Other	5 (6)
Sample size ( <i>n</i> )	
<101	17 (20)
101–500	47 (57)
501–1000	11 (13)
>1000	6 (7)
Gender <sup>a</sup>	
Women	69 (83)
Men	40 (48)
Age group <sup>a</sup>	
Children/adolescents	9 (11)
Adults	73 (88)
Elderly	4 (5)
Place of recruitment <sup>a</sup>	
Community	24 (29)
Health centres/hospitals	39 (47)
Religious	12 (14)
Schools	9 (11)
Others	18 (22)
Theme	
Diabetes/nutrition/cardiovascular	32 (39)
Cancer/cancer prevention	19 (23)
Mental health	17 (20)
Mother/child and reproductive	7 (8)
Infections	6 (7)
Others	2 (2)
Type of intervention <sup>a</sup>	
Individual directed interventions	50 (60)
Community education	20 (24)
Peer navigator-related	7 (8)
Access-enhancing interventions	5 (6)

a: Some studies included more than one category.

### Characteristics of the participants

Recruitment of immigrants was often described as challenging, and many of the studies used more than one setting for recruiting participants. Nearly half of the interventions recruited patients attending health centres and hospitals. Most studies included female participants, some of them exclusively so, especially those examining cancer prevention and reproductive health studies. Five studies included the elderly, eight studies included children and only one investigated adolescents as the main target group. Country of origin was the main variable used to select and classify the participants in all studies except for those conducted in UK and USA, which more often used ethnicity as defining variable. The socioeconomic characteristics and migration status (defined as either reason for migration, legal status and/or length of stay) of the participants were seldom described in the articles. Of those studies that did provide such detail, five studies specifically focused on labour/economic migrants, another five only studied refugees and low-income status of the participants was specified in eight studies.

Generally, the host countries preferentially studied a specific immigrant group (figure 2 and Supplementary table S3). Most studies were conducted in the USA and included immigrants from Latin America and Mexico ('Hispanics'), followed by immigrants with African or Chinese background. In Europe, immigrants from South Asia were typically studied in the UK, those from Turkey in



**Figure 2** Country of origin/ethnicity of migrants included in the studies. Bars divided into studies conducted in the USA or elsewhere. \*Some studies targeted more than one immigrant group, thus the total number of immigrant groups is higher than 83

the Netherlands, and all three studies conducted in Norway included immigrants from Pakistan. There were few studies conducted in the Far East, Asia and the Middle East, Australia and New Zealand examining different immigrant populations.

### Interventions and outcomes

Nearly 40% of the interventions targeted type 2 diabetes, nutrition and cardiovascular diseases and these studies were more likely to include biological measures, typically glycosylated haemoglobin (HbA1c; a biochemical measure of how well persons with diabetes control their sugar level), blood pressure and/or cholesterol levels. Approximately a quarter of the interventions aimed at increasing attendance at screening services for cervical, breast, prostate and colorectal cancers, usually measured by changes in knowledge about, attitudes towards and intention to attend a screening programme rather than actual behaviour. Interventions targeting infections and reproductive, maternal and child care also often used an increase in knowledge as the primary outcome, while interventions on mental health-related themes were more varied in terms of aims and outcomes measures. One study evaluated an intervention to reduce osteoporosis and another measured the attendance of immigrants at physical activity organized at work. References for the studies included by clinical theme are presented in Supplementary table S4.

Although not in the main checklist, some reviewers pointed out that articles frequently assumed the necessity of adaptation and lacked a sound theoretical background for the intervention. According to our classification of cultural strategies, the use of culturally matched materials was the most commonly adopted approach, followed by a range of strategies to involve community members in the research process, and matched intervention deliveries using ethnically and/or linguistically matched or local people. However, reviewers found the assessment of cultural strategies especially challenging due to a lack of information in several articles, in addition to a number of studies implementing complex interventions with unique combination of intervention methods. Most interventions targeted the individuals whilst a quarter included community education. A minority of the studies used peer-navigators, or other access-enhancing interventions.

### Reported effects, challenges and limitations of the interventions

The main intervention was described as beneficial by the authors in 57 studies, while some benefit of the intervention, although not for the main outcome, was reported in 13 studies. Twelve interventions were described as having no effect compared with standard care. Only one study reported that the intervention was partly harmful.



The main limitation highlighted by authors was generalizability, followed by the use of self-reported, non-objective measures, small study sample sizes and high attrition rates. The lack of long-term assessments, the self-selection of participants, and contamination of the non-intervention group were reported in under a tenth of the studies. In some studies, the difficulty of assessing the relative contribution of individual components of a complex intervention was stated. Social desirability bias, the lack of a non-culturally targeted intervention to compare with the culturally targeted one, differential effects among subgroups, poor development of interventions or use of non-validated measures were also mentioned in a few studies.

## Discussion

The aims of this scoping review were to systematically examine the characteristics and range of health intervention evaluations targeting immigrant populations in the published literature and to describe the methods used, as well as the reported effects, challenges and limitations described by the authors for these sorts of interventions. Even accounting for the scoping approach of our review, there is a relative paucity of such studies, bearing in mind the growing size of immigrant populations. This may be a consequence of the challenges faced in undertaking such research or to the lack of priority of immigrants' health in research policies. Decision makers have highlighted the lack of data and paucity of relevant evidence as reasons for not starting interventions that specifically target immigrants.<sup>21</sup> Therefore, we have formulated a set of recommendations (table 2) informed by our analysis of the existing evidence base, which we address in greater detail below.

### Populations targeted

The vast majority of the studies were conducted in the USA. The preponderance of empirical studies conducted in the USA has been previously noted.<sup>22</sup> Although the USA has the highest total number of immigrants in the world, and the highest funding on medical research, this pattern is probably a consequence of research politics in the country encouraging trials to report information on the ethnicity of participants,<sup>23</sup> which can be used in immigration studies. However, a recent scoping review of birth cohort studies in 20 European countries reported that, although 70% of them collected information about migration history or ethnicity, only 26% used that information for data analyses or planned to do so.<sup>24</sup> Countries in the Middle East, with the highest levels of immigration in the world, were poorly represented in our material, as were countries with less inclusive or responsive health systems and restrictive integration policies, such as most of Central and Southeast Europe.<sup>25</sup>

Most studies, both in USA and Europe, focused on specific immigrant groups from relatively few countries of origin, which might reduce the generalizability of findings to other immigrant groups, especially given the lack of information available on other socioeconomic characteristics of the populations studied. Few studies were conducted among refugees, minors or undocumented migrants. Studies most often included adult women as compared with men. Taking all these characteristics into account, we suggest that global research policies should recommend that future studies better reflect the demographic profiles of migrant populations, in particular older people, as their numbers are about to increase in the near future,<sup>26</sup> children and men, and consider interventions targeted at families or multi-generational households when adequate. It is also vital to extend the evaluation on interventions to subjects within all different migrant status: refugees, unaccompanied minors and other vulnerable immigrants, including undocumented migrants.

### Settings and clinical and preventive health topics

We found that chronic and non-communicable diseases were the main target of the identified interventions, followed by interventions to increase receipt of cancer screening programs, similar to a recent review of interventions to improve culturally appropriate health care for different vulnerable groups.<sup>27</sup> This limited range of target areas may give the rise to the false impression that these are the main problems that immigrants suffer from. Other clinical conditions, like mental health problems and infections were subject to study to a lesser degree in our review, and we could not identify studies targeting common illnesses like musculoskeletal disease or gastrointestinal conditions, which are repeatedly reported to be more prevalent among immigrants.<sup>28</sup> We recommend researchers consider the degree to which the conditions or topics addressed in intervention studies reflect the priorities, morbidity and mortality of immigrant populations, as well as other public health areas that are important for both migrant and non-migrant populations.

Nearly a third of interventions recruited patients already attending health centres and hospitals, thereby, by definition, excluding immigrants who do not seek health care, either due to economic or legal status issues. The recruitment of patients at health centres and hospitals might have overestimated the effects of the interventions, especially in studies aimed to increase attendance to cancer screening programs and studies about reproductive and child developmental health, as non-attendees might be less prone to change practices in the absence of symptoms, and may be more likely to have other factors limiting their uptake of (any) healthcare services. We recommend researchers to consider the implications of the recruitment settings and strategies used for including participants with immigrant backgrounds.

### Interventions

Two different approaches can be considered for delivering interventions for immigrant populations. Health interventions for the majority population could be designed to be sensitive to diversity so that they can be equally effective for all citizens regardless of their cultural, religious or other background.<sup>29</sup> Alternatively, one might culturally adapt services and interventions to immigrants' individual backgrounds. Our search was open to both approaches. As previously described,<sup>30–32</sup> many studies evaluated culturally adapted interventions but most lacked clear information about the components of this adaptation, and little to no detail was provided regarding the specific features that constituted cultural tailoring of the intervention. In accordance with an earlier review,<sup>33</sup> few articles explained how and/or why the original ('general population') intervention was inadequate, the adaptation design, the pilot tests conducted, or the refinement of the adaptation. The methods used to interact with the immigrant community in developing the intervention were also seldom reported. In order to understand and eventually replicate the interventions in other settings, we recommend well-grounded theoretically informed intervention models, greater theoretical clarity regarding the adequacy of a culturally tailored approach and more detailed descriptions of the development of interventions, including fidelity, dosage and challenges encountered. Finally, more active involvement of users in all aspects of the study in accordance to accepted good research practice ('co-production') in other research fields is needed.

The studies we were able to capture in our scoping review often failed to consider the broader framework of how socio-ecological factors are important in considering behaviour change. Different theoretical approaches were described in the development of some interventions, including community-based health promotion, the Health Belief Model, the Extended Parallel Process Model, the Transtheoretical Model, the Theory of Planned Behaviour, Freire's empowerment pedagogy or principles of community-based participatory research. However, most interventions

**Table 2** Proposed recommendations for enhancing interventions to improve immigrant health**Populations targeted**

Future studies should better reflect the demographic profiles of migrant populations in particular older people, families, children and men. Refugees and other vulnerable migrants including unaccompanied children and irregular migrants should be further studied.

**Clinical and preventative health topics**

The range of conditions or topics should better reflect the mortality, morbidity and priorities of immigrant populations as well as important areas that are important for both migrant and non-migrant populations.

Need to consider the settings for including patients for preventative studies vs. studies of diagnosis and treatment.

**Interventions**

Well-grounded theoretically informed intervention models are more likely to enhance impact.

Assumption that need for cultural adapted interventions needs to be justified and empirically tested.

Need for greater theoretical clarity for any culturally adapted intervention.

Active involvement of users in all aspects of the study, in line with accepted good research practice (co-production).

Better reporting of development and delivery of intervention.

Consider structural or socio-ecological as well as individual level interventions.

**Methods**

Follow-up small-scale/feasibility studies with larger studies.

Need of studies with longer-term outcome measures to assess sustainability.

Cost-effectiveness analyses should be conducted.

Greater account for socioeconomic status, immigrant status, and length of stay is needed.

Use of instruments that have been validated in the migrant populations particularly if self-reported outcome measure would improve rigour.

Use of objective outcomes, if appropriate, to minimize reporting biases.

**General recommendations (outside scoping)**

Need to compare process and outcome measures for the same migrant population in different countries, different migrant populations in the same country and migrants in host and country of origin.

Other study designs should be explored, such as natural experiments.

targeted individuals and measured change in knowledge as the main outcome for the intervention without any theoretical basis and often with a simple presumption that education on its own would be sufficient to result in behaviour change, regardless of the multiplicity of structural vulnerability factors that are often clustered together<sup>34</sup> acting as barriers to effectiveness. We recommend that researchers consider structural or socio-ecological as well as individual level interventions.

**Methodological recommendations**

Many of the methodological limitations identified by the authors were generic to complex intervention trials such as lack of blinding, inadequate sample size and poor outcome measures, and are not unique to studies with immigrants. Selection bias in recruitment may be even more problematic in this population due to factors such as informed consent<sup>35</sup> and recruiting undocumented migrants, as addressed earlier.

Many studies were under-powered. Some of these may have been intended primarily as feasibility or pilot studies, and they were included in the review if they reported results and no subsequent articles reporting the same intervention could be identified. The observation that many authors reported lack of power as a limitation in their own publications not followed by a further larger definitive RCT, suggests that either the researchers were unconvinced that the intervention was worth pursuing, were unable to persuade a funding body to provide the necessary resources for a future RCT, or the intervention was implemented despite the lack of high-quality evidence. Additionally, only four studies had follow-up for as long as 2-years, so it is unclear whether any short-term benefits of most other interventions would have been sustained. As reported previously,<sup>36</sup> cost-effectiveness analyses in the field are scarce; we only identified one study with such analyses, published in a different article from that found in the identified literature.<sup>37</sup> We thus recommend that research policies should support the follow-up of small-scale studies and where appropriate, funding larger, long-term studies including cost-effectiveness analyses.

Although we attempted to identify migrant status, reason for migration or time lived in the host country in each of the studies, this information was only available in a tenth of the publications, and other socioeconomic variables were seldom reported. We recommend researchers assess socioeconomic status and collect a variety of measures

about their immigrant participants, to enable comparisons between groups and adjustment or stratification of results as needed.

Most authors claimed that the interventions were beneficial despite a number of reported methodological limitations, as previously described in other related reviews.<sup>36,38</sup> The interventions were typically measured by changes in knowledge, attitudes and intention to attend programmes, with the exception of interventions for cardiovascular risks and diabetes. Self-reported measures are open to biased assessment in the absence of blinding of intervention, and this may be more of an issue in an immigrant population due to 'social desirability bias' resulting in overly positive outcome reporting, thereby exaggerating the observed treatment effect. The lack of valid measurement tools for specific immigrant populations and problems with translation remains an issue even in recent studies. No study assessed negative outcomes, such as stigmatization, medical mistrust or experiences of discrimination. We recommend the use of validated instruments and objective outcomes, if appropriate, to improve rigour and minimize reporting biases.

Finally, we acknowledge that the evidence base in this field needs strengthening. In working together in this scoping review, although outside the information obtained in the process, the authors reflected upon the need for a more comprehensive research approach to be able to evaluate and prioritize interventions to improve the health of migrants. This includes the comparisons of process and outcome measures for different (i) immigrant groups in the same population, (ii) the same immigrant population in different countries and (iii) immigrants in the host and country of origin. We should also take advantage of natural experiments like changes in policy and disparities in entitlements in different countries in order to study the effectiveness of interventions for improving immigrant health.

**Strengths and limitations of this scoping review**

Our review also has its strengths and limitations. The extent of our search was broad, as we aimed to give a holistic view of the studies in the field. Thus, a scoping review approach was chosen, as it entails a systematic, transparent method to provide an overview of the type, extent and quantity of research available, and to identify potential research gaps and future research needs in a relatively short period of time.<sup>19,39</sup> The studies were carefully chosen based on a set of pre-defined criteria and expert reviews, and have yielded potentially useful information about the type of health interventions that

have thus far been evaluated for immigrants. However, many studies were first detected by search of the references of the articles selected following our first approach. A systematic review and widening the search to more databases might have given us an even larger and more detailed picture of the field. Also, the exclusion of other languages than English in our search will have omitted studies published in national journals in non-English speaking countries, though this is probably infrequent when reporting international immigrant health. Nevertheless, we would expect most health interventions to be reported in journals captured by these two databases, and our aim was to have a systematic overview of the field rather than an exhaustive capture of every single published article.

In an effort to capture all types of health intervention evaluations targeting immigrant populations, our scoping review includes studies on different health domains that may be subject to differing challenges in design, implementation and outcome measures used regardless of the target group. Due to the review aiming at a general overview these aspects were not discussed in detail in this article.

Our team was large, and different countries and disciplines were represented as recommended for scoping reviews.<sup>18,19</sup> We believe that the benefits of engaging a large, inter-disciplinary and international team in terms of widening opinions for future recommendations outweighed the challenges related to consensus and overcoming the challenges of working across large geographies.

## Conclusions

This scoping exercise has usefully highlighted the current state of intervention studies targeted at immigrant populations. We hope that researchers, funders and health care commissioners can benefit from considering our list of recommendations when deciding upon the scope, nature and design of future research projects in this area.

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*Conflicts of interest:* None declared.

## Supplementary data

Supplementary data are available at *EURPUB* online.

### Key points

- The need and eventual development of adapted health interventions to migrants should be evidenced based.
- Well-grounded theoretically informed intervention models are more likely to enhance public health impact.
- Future studies should better reflect the demographic profiles of migrant populations and particularly target the most vulnerable migrant groups.
- The range of conditions or topics should better reflect the mortality, morbidity and priorities of immigrant

populations as well as important public health areas for both migrant and non-migrant populations.

- There is a need of studies with longer-term outcome measures and cost-effectiveness analyses to assess sustainability.

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## Assessing trauma and mental health in refugee children and youth: a systematic review of validated screening and measurement tools

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**Background:** It is estimated that children below 18 years constitute 50% of the refugee population worldwide, which is the highest figure in a decade. Due to conflicts like the Syrian crises, children are continuously exposed to traumatic events. Trauma exposure can cause mental health problems that may in turn increase the risk of morbidity and mortality. Tools such as questionnaires and interview guides are being used extensively, despite the fact that only a few have been tested and their validity confirmed in refugee children and youth.

**Aims:** Our aim was to provide a systematic review of the validated screening and measurement tools available for assessment of trauma and mental health among refugee children and youth.

**Methods:** We systematically searched the databases PubMed, PsycINFO and PILOTS. The search yielded 913 articles and 97 were retained for further investigation. In accordance with the PRISMA guidelines two authors performed the eligibility assessment. The full text of 23 articles was assessed and 9 met the eligibility criteria.

**Results:** Only nine studies had validated trauma and mental health tools in refugee children and youth populations. A serious lack of validated tools for refugee children below the age of 6 was identified.

**Conclusions:** There is a lack of validated trauma and mental health tools, especially for refugees below the age of 6. Detection and treatment of mental health issues among refugee children and youth should be a priority both within the scientific community and in practice in order to reduce morbidity and mortality.

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## Introduction

The estimated number of refugee children below 18 years of age worldwide amounts to ~10 million.<sup>1</sup> This is the highest figure in

more than a decade and the number increases dramatically if asylum-seeking children and internally displaced children are also taken into consideration. Not least, the conflict in Syria has